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(54) PRODUCTION OF POLYOLEFIN

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a process for the production of a branched polyolefin comparable or superior to conventional polypropylene polymer in physical properties and having high melt tension and excellent resin compatibility.

SOLUTION: A polyolefin composed of an olefinic macromonomer and one or more comonomers selected from a 2-20C α -olefin, a cycloolefin and a styrene compound is produced by using a catalyst composed of (A) a catalyst component containing at least one kind of compound selected from compounds of group 4 transition metal of the periodic table and (B) a cocatalyst component. The olefinic macromonomer satisfies the requirements that (1) the weight-average molecular weight is 200-100,000, (2) the ratio of vinyl group in total unsaturated terminal is $\geq 60\%$ and (3) the content of ethylene or propylene is $> 50 \text{ mol.}\%$.

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* NOTICES *

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CLAIMS

[Claim(s)]

[Claim 1] (A) the approach of manufacturing the polyolefine which consists of an olefin system macro monomer and a comonomer more than a kind chosen from the alpha olefin of carbon numbers 2-20, an annular olefin, and styrene under existence of the catalyst which consists of a catalyst component which was chosen from the transition-metals compounds of the 4th group of the periodic table, and which contains a kind at least, and a (B) co-catalyst component -- setting -- (1) of the following [monomer / above-mentioned / olefin system macro], and (2) -- and (3) --

(1) ** weight average molecular weight is 200-100000, and the percentage of the vinyl group occupied at all the ** partial saturation ends is 60% or more, and it is the polyolefine with which ** ethylene or a propylene content exceeds 50-mol %.

(2) ** weight average molecular weight is 200-100000, and it is the polyolefine with which [Product eta] and C of ** limiting viscosity [eta] (deciliter/g) and the end vinyl concentration C (1000 an individual / carbon atoms) are in the range of 0.05-2.0, and ** ethylene or a propylene content exceeds 50-mol %.

(3) It consists of the comonomer and polyene more than a kind chosen from the alpha olefin, the annular olefin, and styrene of the ** carbon numbers 2-20. Weight average molecular weight is 200-100000. And ** limiting viscosity [eta] (deciliter/g), an end -- vinyl -- concentration -- a polyene -- the origin -- carbon - carbon -- a double bond -- concentration -- the sum -- C -- ' (1000 an individual / carbon atoms) -- a product -- [-- eta --] - C -- ' -- 0.05 - ten -- the range -- it is -- ** -- a polyene -- a content -- zero -- exceeding -- 20 -- a mol -- % -- less than -- it is -- polyolefine -- it is .

The manufacture approach of the polyolefine characterized by being in *****.

[Claim 2] The manufacture approach according to claim 1 that the transition-metals compound of the 4th group of a periodic table is a titanium compound, and a catalyst component is [a co-catalyst component] the organometallic compound of the 1-3rd groups of a periodic table including this titanium compound, magnesium, and a halogen.

[Claim 3] The manufacture approach according to claim 1 which the transition-metals compound of the 4th group of a periodic table is a compound which has a cyclopentadienyl frame, and is the thing which was chosen as the ionicity compound list which a co-catalyst component reacts with an aluminum (B-1) oxy compound and the above-mentioned (B-2) transition-metals compound, and can be changed into a cation from clay (B-3), the clay mineral, and the ion-exchange nature stratified compound, and which consists of a kind at least.

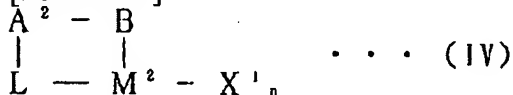
[Claim 4] the transition-metals compound of the 4th group of the periodic table who has a cyclopentadienyl frame -- (general formula (A-1) I) general formula (A-2) (II) general formula (A-3) (III) CpM1R1aR2bR3c ... (I)

Cp2M1R1dR2e ... (II)

(Cp-A1f-Cp) M1R1dR2e ... (III) In [type (I) - (III) M1 The 4th group transition metals of a periodic table are shown, and Cp shows the radical chosen from a cyclopentadienyl group, a substituent cyclopentadienyl group, an indenyl group, a permutation indenyl group, a tetrahydro indenyl group, a

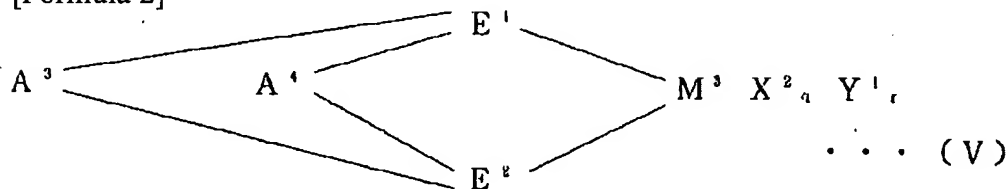
permutation tetrahydro indenyl group, a fluorenyl group, and a permutation fluorenyl group. R1 and R2 And R3 A ligand is shown independently, respectively and it is A1. Bridge formation by covalent bond is shown. a-e shows the integer of 0-4 independently, respectively, and fills $a+b+c=(\text{valence of M1})-1$, and $d+e=(\text{valence of M1})-2$. f shows the integer of 0-6. R1 and R2 And R3 Two or more [the] may combine with each other, and it may form a ring. (II) In a formula and (III) a formula, two Cp(s) may be the same and may differ mutually.] The transition-metals compound, general formula (A-4) which are come out of and expressed (IV)

[Formula 1]



M2 shows the 4th group transition metals of the periodic table among [type. L shows the radical chosen from a cyclopentadienyl group, a substituent cyclopentadienyl group, an indenyl group, a permutation indenyl group, a tetrahydro indenyl group, a permutation tetrahydro indenyl group, a fluorenyl group, and a permutation fluorenyl group. A2 The radical of the bivalence containing the element chosen from the elements of the 13th, 14 and 15, and 16 groups of the periodic table, the affinity radical containing the element with which B was chosen from the elements of the 14th, 15, and 16 groups of the periodic table -- being shown -- this -- A2 B arbitration -- together -- becoming -- a ring -- forming -- **** -- X1 the ligand, the chelated ligand, or Lewis base of sigma bond nature -- being shown -- n -- M2 X1 of plurality when it is the integer of 0-6 which change with valences and n is two or more Even if the same, you may differ.] It is a general formula (A-5) (V) to the transition-metals compound and list which are come out of and expressed.

[Formula 2]



M3 shows titanium, a zirconium, or a hafnium among [type: E1 And E2 It is the ligand chosen from a substituent cyclopentadienyl group, an indenyl group, a permutation indenyl group, a hetero cyclopentadienyl group, a permutation hetero cyclopentadienyl group, the amide group, the phosphide radical, the hydrocarbon group, and the silicon content radical, respectively. A3 and A4 It minds and the structure of cross linkage is formed, and even if they are mutually the same, you may differ. X2 the ligand of sigma bond nature -- being shown -- X2 the case where there are more than one -- two or more X2 even when it is the same -- differing -- **** -- other X2, E1, and E2 Or Y1 The bridge may be constructed. Y1 a Lewis base -- being shown -- Y1 the case where there are more than one -- two or more Y1 You may differ, even if the same. Other Y1, E1, and E2 Or X2 The bridge may be constructed and it is A3. And A4 It is the bridge formation radical of the bivalence which combines two ligands. The hydrocarbon group of carbon numbers 1-20, the halogen content hydrocarbon group of carbon numbers 1-20, A silicon content radical, a germanium content radical, a tin content radical, -O-, -CO-, -S-, -SO2-, -Se-, -NR24-, --24-, -P(O) R24-, -BR24- or -AlR24- is shown, R24 shows a hydrogen atom, a halogen atom, the hydrocarbon group of carbon numbers 1-20, and the halogen content hydrocarbon group of carbon numbers 1-20, and even if they are mutually the same, they may differ. q shows [(valence of M3)-2] for the integer of 1-5, and r shows the integer of 0-3.] The manufacture approach according to claim 3 which comes out and is chosen from the transition-metals compound expressed.

[Claim 5] The manufacture approach according to claim 1 by which at least one of the transition-metals compound of the 4th group of the periodic table and the co-catalysts is fixed to support.

[Claim 6] Polyolefine manufactured by the approach according to claim 1 to 5.